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CASE REPORT

Vein Patch Rupture after Carotid Endarterectomy

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Introduction

Controversy continues to surround the use of patch angioplasty after carotid endarterectomy. Vein patch rupture is considered to be an uncommon occurrence with an incidence of 0.4–4%[1–3] related to the use of long saphenous vein harvested from the ankle. A recent publication has suggested this can be avoided by using long saphenous vein from the upper thigh. However this case confirms that there is still a risk of rupture even when vein patches are taken from the upper thigh long saphenous vein.

Case Report

A 51-year-old male with widespread arterial disease was admitted for an elective left carotid endarterectomy following recent transient ischaemic attacks affecting his speech, vision and right hand. Four years previously he underwent an uncomplicated right carotid endarterectomy with synchronous coronary artery by-pass grafting. Over this intervening period his hypertension had been well controlled but despite strenuous advice he continued to smoke heavily.

Preoperative assessment of the left internal and external carotid arteries by colour coded Duplex ultrasound demonstrated large areas of mixed atheroma and dense calcification with a 90% left internal carotid stenosis. His right carotid artery had completely restenosed with no evidence of forward flow and the right vertebral artery appeared occluded.

At operation under general anaesthesia left carotid clamping induced a fall in middle cerebral artery velocity from 38 to 2 cm/s, detected by transcranial doppler. A drop of this magnitude indicated very poor collateral circulation and a Pruitt Inhara shunt (Meadox Bedfordshire, U.K.) was inserted. An ulcerated haemorrhagic plaque with overlying thrombus and debris was endarterectomised and the arteriotomy closed using continuous 6/0 polypropylene sutures (Ethicon Edinburgh, U.K.) with a vein patch harvested from the long saphenous vein of the right upper thigh. Postoperative middle cerebral artery velocity was restored to 74 cm/s.

The vein from which the patch had been harvested was preoperatively mapped using Duplex scanning. At that time the vein was deemed to be greater than 3 mm in diameter, although at removal it appeared to be narrow and thin walled.

Postoperative recovery was excellent but on day four there was a sudden massive haemorrhage from the endarterectomy site. After immediate ward resuscitation bleeding was controlled by pressure and the patient immediately transferred to the operating theatre.

At exploration the vein patch looked thin walled with a longitudinal rupture through the central portion, suture lines were still intact with no discernible focus of infection. The original vein patch was completely removed and the arteriotomy closed with a patch of internal jugular vein.

Postoperatively the patient did not regain consciousness and died 7 days later. A CT scan showed cerebral oedema with multiple left hemisphere infarcts.

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Discussion

Since 1989 vein patch angioplasty has become the preferred method of closure after carotid endarterectomy in Great Britain and Ireland.[4] Advocates of this technique claim that re-stenosis and thrombosis are minimised thus improving long term patency,[3,5] though vein patch angiopasty is not without its complications as previous patch ruptures have been well described. A comprehensive review of the literature by John *et al.* revealed 38 such cases, 97% were from ankle veins only one was attributable to upper thigh long saphenous vein.[1]

Vein patch rupture is still an area of much debate. A multitude of variables have been investigated including rupture pressure[6] and vein thickness with some authors recommending autologous thigh vein of 4–5 mm providing the most reliable reconstruction with its greater tensile strength.[3,7] Reinforcement techniques have also been employed in some centres using synthetic mesh wraps around the endarterectomy site.[8] There have been suggestions that central necrosis of vein patches, secondary to ischaemia may contribute to rupture but the evidence for this is inconclusive. Reluctance to harvest the upper long saphenous vein stems from a desire to try and preserve it for possibly later coronary or lower limb re-vascularisation, although this may rarely compromise its future use.[9] In contrast to upper thigh veins those of the ankle have often been used because they can be exposed with minimal dissection and have paucity of branches and valves.[8]

Prosthetic patches in comparison to vein patches are less commonly used after carotid endarterectomy.[4] Most recently polytetrafluoroethylene (PTFE) patch angioplasties have been introduced, disruption of which has not been documented[10] and there are no recordable cases of aneurysm formation or predisposition to infection to date.[11] However there are still some reservations with PTFE grafts because of serious post-operative bleeding through suture lines.[12]

In conclusion vein patch angioplasty is still indicated if re-stenosis is to be avoided. There is no easy solution to the problem of vein patch rupture but upper thigh long saphenous vein should still be used unless the surgeon has any reservations about its quality (i.e. too small, thin or narrow). In the event of not being able to harvest a quality vein patch an alternative such as a Dacron patch would be implicated if direct closure is not to be undertaken.

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